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LAND UTILISATION SURVEY AS A SCHOOL AND COLLEGE EXERCISE*

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There is wide agreement among educators that at some time during a school course a place should be found for the study of the home area and the home environment. It may be that at a very early stage simple observations on weather may serve to arouse interest in the influence of geographic factors on every day life; it may be that at a later stage an elementary study of the town or village community must precede any attempt to understand current social or economic problems. Many will urge that there can be no real appreciation of life in other lands without constant comparison with the home life as a basis for understanding. Thus there has grown up the idea behind the "Regional Survey Method." Without attempting an exact definition, a regional survey may be described as an intensive study of the home area. It is one of the interesting features of the work that it is never complete. There is, in the first place, the physical geography to be considered as the essential background—the disposition of hill, valley and plain; the underlying geological structure which helps to determine those surface features; the climate which plays its part in their evolution; the soils which result, at least in part, therefrom; the natural vegetation cover which thereupon takes possession of the land; the wild animal life which takes advantage of the environment thus provided. This is only the background; the innumerable activities of man remain to be considered, their evolution in time and their distribution in space. These activities of man and the changes he has wrought supply an immense field for interesting study. The more obvious things, such as agricultural activities, population distribution, transport and communications suggest themselves immediately, but a great

*Summary of paper read before the Annual Meeting of the National Council of Geography Teachers at Evanston, December 29, 1933.

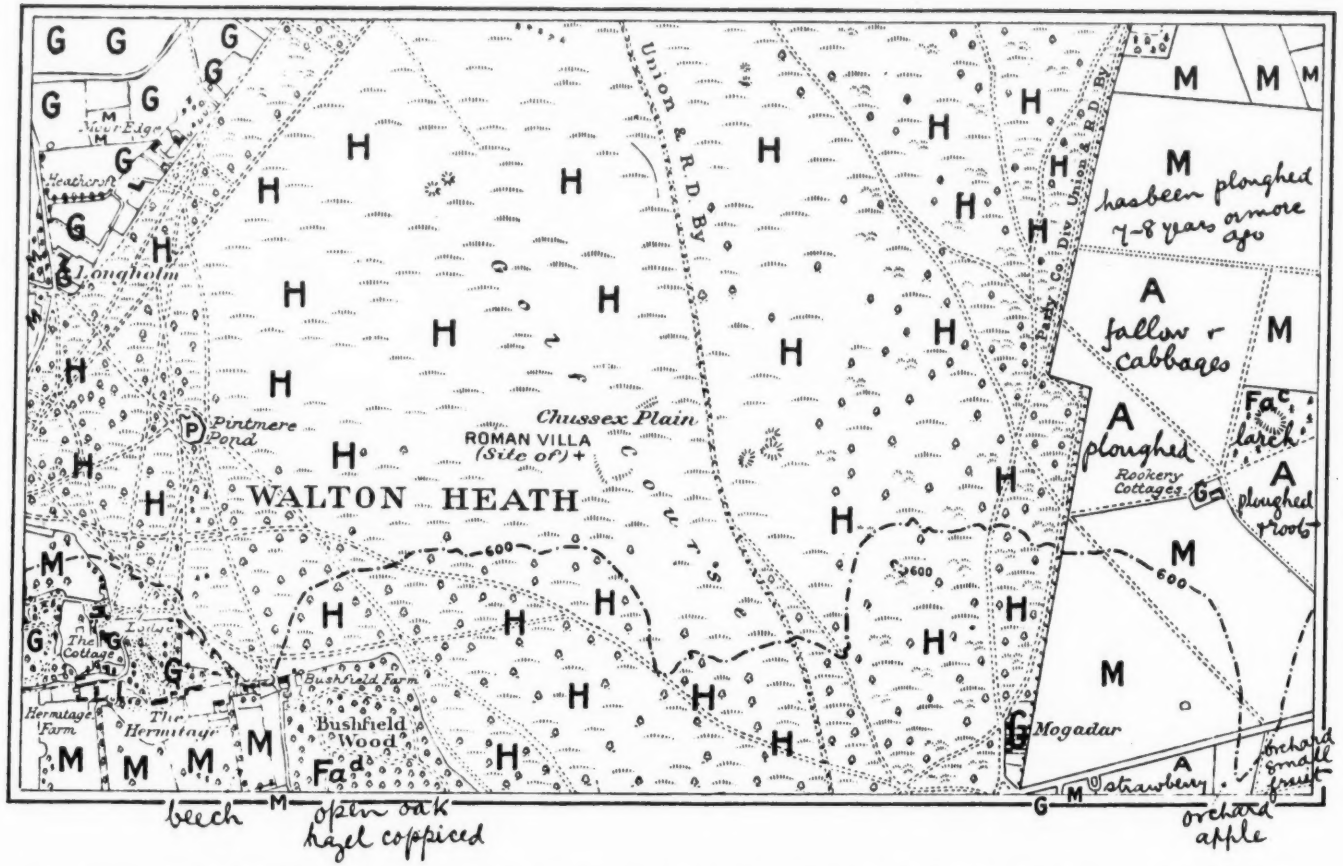

FIG. 1. Specimen of a finished field map (reduced), of part of Britain showing lettering and notes. The area covered is 1½ miles across.

variety remains—all can be studied in the neighborhood of the school, the facts recorded and mapped.

PURPOSE

But what is the purpose of such work for our children? It is clear that a regional survey starts in the realm of physical geography, it develops into nature study; it returns to the sphere of human geography but cannot escape, if it is to be of real use, a marriage with history; it is inevitably involved with the fringe of economics and is vitally concerned with that important tho neglected sphere of knowledge which has been called civics. Therein lies both the strength and weakness of the regional survey method. If we start with the assumption that a fundamental aim of juvenile education is to provide an adequate preparation for adult life—in all its phases, not merely the vocational—there is surely nothing finer than the intensive study of the home region and of the local environment as a starting point for a training in citizenship. For it cannot but awaken an appreciation of the facts of local geography, local history and the local rural or urban economy. It is one of the great advantages of the method that it ignores subject boundaries and does much to weld together the whole school work. The weakness or rather the difficulty of the work lies in the fact that it is so all embracing: few teachers can have the breadth of training required to follow it thru its innumerable phases, and it would seem at first that method can only be followed where a well staffed school has a team of teachers willing to work in the closest union.

In 1926 an attempt was made in England to hold an exhibition of regional surveys which had been carried out in schools. This exhibition showed:—

(1) that anything approaching a comprehensive local regional survey could only be attempted by a large and well-staffed school or one where there was especially enthusiastic leadership.

(2) that the surveys undertaken were extraordinarily varied; no two were alike and so the results in one area were not directly comparable with those from another.

(3) that in some cases small rural schools had undertaken with conspicuous success local surveys of a restricted character.

It was the last point which gave the clue to what was needed—a *simplified form of survey which could be undertaken by the smallest*

rural school—even single teacher schools—which would carry the advantages of the method. Another consideration entered in—it was clear that the *results of a unified scheme might well be made of permanent, national value,* thus adding a new and important incentive.

By a great pioneer effort Mr. J. L. Holland, Director of Education for the English County of Northamptonshire, set the schools of his county the task of constructing a land utilisation map of the county, distinguishing three types of land—woodland, pasture and cropped land. With this work before them (it was completed in 1928) preliminary surveys were carried out to test various classifications of land with the idea of evolving one slightly more elaborate but at the same time simple enough for school children to understand. Thus the classification which is detailed below was drawn up after consultation with agriculturalists, foresters, town planners, park specialists and others concerned with the use of land but bearing in mind that the scheme would have to be interpreted by the untrained.

LAND UTILISATION SURVEY OF BRITAIN

The Land Utilisation Survey of Britain came into existence as an entirely independent body in October, 1930. It had an immediate twofold objective (1) to make a record of what every single acre of Britain was being used for at the present day, (2) to have the work done by volunteers from schools and colleges so that the intelligent interest of the rising generation might be aroused in the land and its problems.

The principal idea was that every school in the country should undertake to study the area around the school and to record on a map the present use of the land. In Britain it was aimed to cover the whole country, but it is clear that a very useful record can be made where only a part is attempted. The Survey was organized on a county basis and each county was under a county organiser living on the spot. The first person approached to take on this responsibility was the County Director of Education or equivalent officer. Altho the work was entirely voluntary and there was no question of compulsion, it is gratifying to record that in 70 out of 93 cases the Director either became the county organiser or asked one of his school superintendents to carry out the work of distributing the necessary maps and the sheets of instruction. The only cost involved was the cost of the base maps and this was extremely small when each school just required the one local sheet

or the county the set for the county. The teachers and children became enormously enthusiastic when they realised the part they were playing in a national work. *It is estimated that 10,000 schools and 250,000 children have taken part.*

METHODS FOLLOWED

Turning now to the methods which were in general followed, it must be mentioned that Britain is both fortunate and unfortunate. Fortunate in that there exists a fine series of base maps on the scale of six inches to the mile and on which field boundaries are shown; unfortunate in that so much of the country is divided up into extremely small fields of irregular shape. Altho in America such detailed base maps are rarely available, it is here much easier to do the work on the scale of one inch to one mile because of the larger size of the field and the rectangular arrangement which is the rule in so many areas. To illustrate the possibility of similar work being carried out in this country, a portion of the field map of a survey made by Professor K. McMurry in Michigan has been included (see Fig. 2).

Each school undertaking the work thus received: (1) a copy of the local map (or preferably two, one for rough work, one for the finished map), (2) a sheet of instructions of what to do, part of which is reproduced. The exact method of work was left to the teacher. One was to take small parties into the field and fill in the map. Another was to trace off portions of the map and duplicate them so that each pupil could have one. But perhaps the best method, and the one involving least work for the teacher and the greatest educational benefit to the children, was to pin the map up in the class room and to let the children make tracings (where one inch maps are used enlargements which can be a drawing exercise) on ordinary tracing paper. These tracings were filled in by the children themselves on their way home. But the *same area* was covered on *different* days by *different* groups of children, so that the element of competition came in and the genuine desire to "get it right." Incidentally the parents often entered into the competition with zest! Then later the map in the schoolroom was filled in before the eyes of the children so that all might see and agree. The coloring of the map followed and the completed work was the pride of all. The question is often asked, "What is the standard of accuracy of the work?" The answer is, as a rule, surprisingly high, especially from rural schools where the children and their parents have been

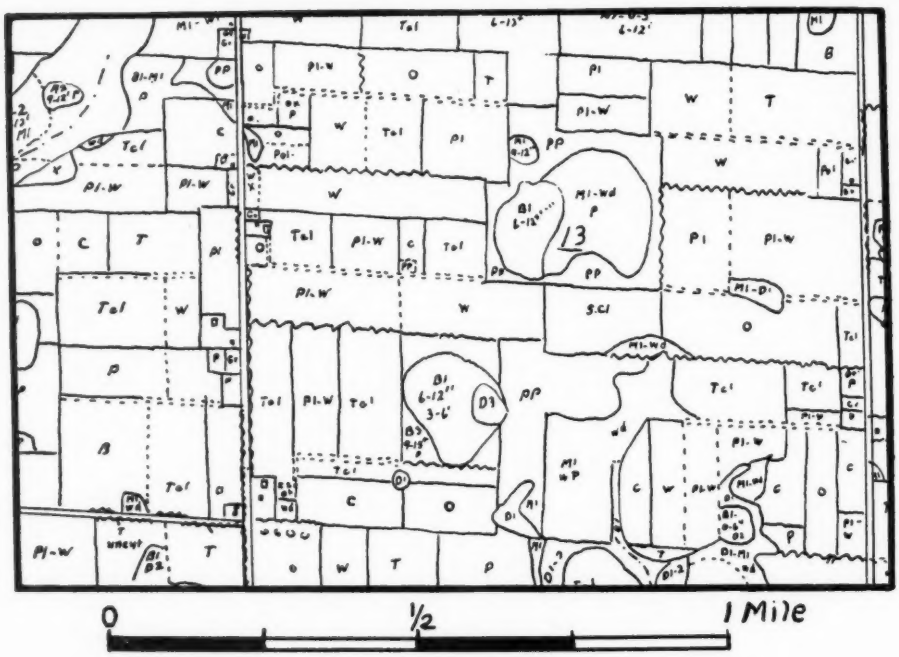

FIG. 2. Small portion of a map of Williamston Township, Michigan

Upland Timber Associations.

A1—Oak, Hickory, Elm, Basswood, White Ash, Cherry.
A2—Sugar Maple, Beech, Oak, Elm, Hickory, White Ash, Cherry.
A3—Oak, Hickory, Beech, Maple, Ironwood.

Swamp and Semi-Swamp Timber Associations.

B1—Elm, Ash, Silver Maple, Swamp White Oak, Aspen, Tamarack, Willow.
B2—Tamarack, Aspen, Maple, Willow.
B3—Elm, Ash, Oak, Silver Maple, Sycamore, Beech, Basswood, Walnut, Butternut, Aspen, Cherry, Cottonwood, Tulip.
B4—Pin Oak, White Oak, Elm, Red Maple.

Shrub-Brush Associations.

D1—Willow, Aspen, Birch, Sedges.
D2—Osier, Huckleberry, Ilex, Tamarack, Aspen, Birch.
D3—Aspen, Elm, Osier, Buttonbush, Sedges (small pot-hole type).
D4—Oak, Hickory, Aspen, Maple, Sumach. (Second growth after cutting.)
D5—Buttonbush.

Marsh Associations.

M1—Sedge, Bluejoint.
M2—Cattail, Sedges, Sagittaria.
M3—Waterlily, Sagittaria.
M4—Lake Bulrush.
M6—Leatherleaf, Sphagnum, Blueberry.
M7—Sedge, Bluejoint, Shrub Willow, Osier, Aspen.

brought up on the land. It is a great advantage when neighboring areas are carried out by different schools and the maps must agree along the margins.

The following are abstracts from the leaflet distributed to all helpers, showing the method of carrying out the survey.

The following classification must be adopted and is most important:

The maps *MUST be marked with the letters as shown below,* and *may* in addition be colored with water color or crayons. *Such coloring must only be very light,* since heavy coloring obscures the detail on the underlying map, as well as the lettering on the photographed copy.

DESCRIPTION	LETTER MARKING (essential)	COLOR MARKING
(1) FOREST and Woodland to be marked	F	Dark Green.
(2) MEADOWLAND and permanent grass	M	Light Green.
(3) ARABLE or tilled land, fallow, rotation grass, and market gardens (*see note*)	A	Brown.
(4) HEATHLAND, moorland, commons, and rough hill pasture	H	Yellow.
(5) GARDENS, allotments, orchards, nurseries, etc. ...	G	Purple.
(6) LAND agriculturally unproductive, e.g., buildings, yards, mines, cemeteries, etc.	W	Red.
(7) PONDS, lakes, reservoirs, ditches, dykes, streams and anything containing water	P	

The completed map should have the *name and address* of the Surveyor and the date, written on the *FRONT of the sheet.*

NOTES ON THE CLASSIFICATION

1. FORESTS and woodland are marked on some of the base maps, but all the areas must be checked. Care must be taken to include the newly planted areas. When this has been done the woodland must be classified as follows:—

(*a*) *Lumber Forest,* big trees of merchantable timber or woodland being grown for that purpose, sufficiently close for their crowns to touch; also state whether the trees are *Coniferous, Deciduous, Mixed.*

Non-Cropped, Cleared Lands.
X—Apparently abandoned.
PP—Permanent Pasture.
WP—Wet Pasture.

Cropped Lands.

W—Wheat	Bw—Buckwheat	Sw—Sweet Clover	TCl—Timothy and Clover
C—Corn	Be—Beets	Gr—Garden	P—Temporary pasture
O—Oats	A—Alfalfa	P—Peas	
R—Rye	Cl—Clover	Pt—Potatoes	
Br—Barley	T—Timothy	Or—Orchard	
B—Beans	Rt—Redtop	Pl—Plowed land	

Timber Sizes—0-3, 3-6, 6-9 inches diameter at breast height.
Timber Stocking—' scattered stand; '' medium; ''' heavy.
Brush along fences indicated by waved lines.

(*b*) *Woodlots* of smaller trees or woodland that is cut over every few years for firewood, fencing, posts, etc.

(*c*) *Scrub*, any small bushes or trees unfit for cutting.

(*d*) *Cut over areas*, forest cut down and not replanted. This requires a note stating its present character.

A note should also be made against any forest or woodland which is not intended to supply timber, but is ornamental, for screening houses and gardens, etc.

In practice it has been found that the simplest way of dealing with forest or woodland on the field map is as follows:—Mark each piece of forest with the letter F; then distinguish its character according to the above classification as Fa, Fb, Fc, Fd. Then distinguish coniferous (c), hardwood or deciduous (d), or mixed (m), thus: F_{a_c}, F_{b_d}, F_{b_m}, etc. Any woodland not intended to supply timber may be shown by underlining the symbol thus: $\underline{F_{a_d}}$. There is sometimes room to mention in brackets the chief trees, *e.g.* (oak) (spruce), etc.

Plantations of trees intended for timber should be marked Fa, with a note "plantation."

2. MEADOWLAND AND PERMANENT GRASS. Care must be taken not to include rotation grass (grass grown in rotation with crops) under this classification.

3. ARABLE or tilled land includes rotation grass and fallow land. At the present time, when much land which was recently arable is being converted to permanent grassland, its appearance, showing evidences of recent cultivation, gives rise to doubt as to whether it is Arable or Meadow. In such cases, information should be obtained from the farmer. A point, easily recorded, which may well be added to the map is the crop actually being grown at the date of the Survey. MARKET GARDENS (truck farming areas) are arable, being merely a special form of agriculture and should accordingly be marked A. Where it is quite clear that they are market gardens, they should be marked A (M.G.).

4. HEATHLAND, MOORLAND, COMMONS and ROUGH HILL PASTURE. This type of land includes much abandoned farm land. Swamps and marshes are often used as rough pasture, and should be included here. It is advisable to make a special note against any land where there is any doubt, saying what use is made of it.

5. GARDENS, ORCHARDS, NURSERIES, etc. house lots or houses with gardens sufficiently large to grow a few vegetables or even flowers should be marked G (garden) since the area is productive. Backyards and other areas agriculturally unproductive should, however, be marked W. ORCHARDS are already distinguished on some maps (but should, of course, be checked). They must be marked G. In some orchards, in addition to the fruit trees, the ground is used for grazing or for agriculture. In such cases they should be marked G(M) when used for fruit and pasture, or G(A) when used for fruit and ground crops. The addition of the word "orchard" is useful.

6. UNPRODUCTIVE LAND. This includes buildings, yards, mines, cemeteries and waste land, *i.e.*, all ground of which the soil is not productively used. It is advisable to make a special note stating the character of all considerable areas marked (W).

OTHER POINTS

Public parks are large gardens used by the public, and should be marked G. with the note "Public park."

Golf Courses can sometimes be used for grazing, and then are permanent grassland (M). Others are heathland and moorland (H). Mark them also with the words "Golf Course."

Sports Grounds are usually grassland but where devoted entirely to sports, they should be specially distinguished, *e.g.*, M. (Sports).

Poultry Farms usually occur on meadowland. A special note should be made against them.

New Buildings, Roads, etc., made since the map was printed should be sketched in as far as possible. In the case of a new building estate it is not necessary to mark in every house, but the general plan of the roads and lines of houses should be indicated, and in the case of undeveloped estates the approximate boundaries should be ascertained and a note made of the estates. When a whole area is marked off as "Building Estate" a note should be added as to whether it is undeveloped (lying waste), partly developed (scattered dwellings), or more fully developed.

N.B.—Notes and comments can be written in the margin of the map upon any points of interest or difficulty of interpretation.

Remarks concerning the types of field boundaries, kinds of crops and fruits, grazing animals, etc., are extremely useful.

EDUCATIONAL VALUES

It is not the purpose of this paper to enlarge on the educational results of the survey. But those who have taken part are unanimous in their praise. Among the advantages of this type of work may be noted:—

(1) The training in careful map-reading, which all citizens require in greater or less degree.

(2) Accuracy of observation of every day things. In this case with the knowledge that others will use and judge the observations.

(3) Completeness of observation—every field must be visited. As an example of the lacunae which may exist in our knowledge of our own home region, the writer, when engaged in this work, "discovered" within 500 yards of the house where he had lived for five years a pond large enough to attract fishermen from a distance.

(4) The arousing of interest in the why and the wherefore of what is found to exist.

(5) The awakening of civic consciousness and the idea of social service. The teacher and the children in remote country districts are made to feel that they are doing something which brings them into direct contact with the life of the whole country and that the work would not be complete without their little bit.

Perhaps the finest tributes come from those who were at first opposed to the work. Some farmers were doubtful about trespassing and damage to crops. This is what one afterwards wrote in the local newspaper:

"Hi! come here!" I shouted, and the two boys who had not observed my approach along the far side of the hedge, started and looked up. The natural alarm of the young trespassers upon the advent of a farmer was apparent on their faces, and for a moment they seemed to contemplate flight; however, after a moment's hesitation, the older of the two came rather timidly towards me, followed at a strategic distance by his companion. "What are you doing here?" I enquired. "Surveying." "What?" "Surveying your crops." "Let's have a look," and I held out my hand for the

paper one of them carried. It was surrendered without demur, and sure enough, there was a section of a six-inch to the mile survey map, which covered the district in which my farm is situated. The boundaries of the fields were marked on it and pencilled on each square was a letter "A" or "M." "H'm" I said, "and what's it all about?" The elder boy explained. "All right," I remarked, "carry on, but don't damage any fences." "Thank you sir, we won't" answered the younger boy, who, up to now had been silent.

Returning home, I ran into their schoolmaster, and asked him for further particulars about the scheme, which he readily gave.

"Thank you sir," I said; "but don't you find it rather hard to get the children to give up their time to this work? Wouldn't they rather play games and so forth?" "Twenty per cent would," was the reply "but the remaining eighty per cent are quite sufficient to do the work. Of course they don't need to give up many nights, and it's quite a voluntary task. I find no difficulty in obtaining their willing co-operation, and they are learning valuable lessons in self-help and initiative; besides, look what a feeling of pride will be theirs when the final printed map is published and they are able to point to a section of it and say 'I did the work of surveying that.' "

"It seems to me that this is education with a purpose: to so interest children that they work in their spare time, find pleasure in that work and give to the community a valuable record as a result of their labours."

PERMANENT VALUES

Turning now to the results of permanent value of such a survey, it can be stated at once that the map of any and every area completed by a school should be copied by a photographic or photostat process and a complete set kept in some central location as a record for future study. The greater part of Britain has been covered in the three years 1931 to 1933 and copies of all maps have been made. These are now being studied and edited and a series of finely colored maps on the scale of one inch to one mile are being published. These form an amazing record of the fine work carried out by the schools and on each sheet is printed the list of those responsible. A representative set of eight sheets, illustrating different types of country, is now available at a cost of eight dollars. A specimen sheet, paper folded, will be sent for $1 or folded and mounted on linen for $1.25 on application to the Secretary, Land Utilisation Survey of Britain, Houghton Street, London, W. C. 2, England. These maps will illustrate at once the great variety of uses of the Survey. In the first place they have been described by a former Surveyor-General of Britain as the most complete topographical maps ever made. Of their use as a basis for the future rational planning of land no more than passing mention can be made. But they do stand as a permanent memorial to the teachers and the schools of the dark years of the Great Depression.

ST. THOMAS: THE KEYSTONE OF THE ANTILLES

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About forty miles to the east of Puerto Rico lies the island of St. Thomas, a small bit of United States territory which contains 28.5 square miles of rugged, rolling, topography and a population of 9,834 people, approximately 90 per cent colored. On a continental

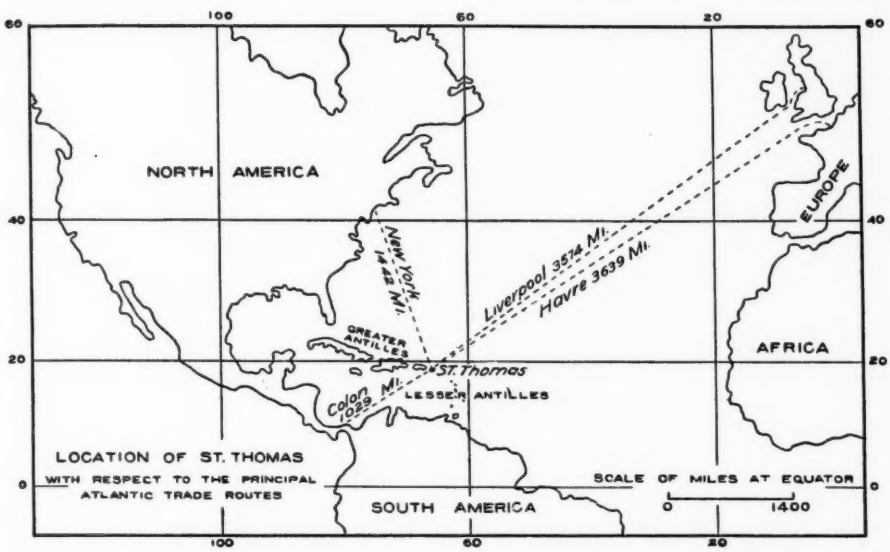

FIG. 1. Location of St. Thomas. St. Thomas lies at the intersection of north-south and east-west Atlantic trade routes and is on a direct line between European ports and the Panama Canal. A strategic location near the outer arch of the Antilles and one of the few good harbors in the Caribbean are geographic advantages which have made the island known thruout the world. The figure is based upon Map 2, page 15, "Census of the Virgin Islands of the United States," November 1, 1917. The dot representing St. Thomas has been enlarged to make it easily recognized.

map (Fig. 1) this little outer bastion of the engulfed Antillean range appears as a mere dot, but to seamen it possesses an importance greatly out of proportion to its size. Indenting the submerged shore line of its southern coast is one of the safest harbors in the West Indies, and here, for centuries, was the ganglion of the nerve system for sailing ship commerce from the Indies and the Spanish main.

The history of St. Thomas always has been closely associated with this splendid harbor and the island's strategic location. Only a short time after the discovery by Columbus in November, 1493, this Caribbean keystone[1] served as an assembling point for Spanish treasure ships—the boats with bellying sails which looked like strange sea fowl and which carried to Spain the Aztec and Inca gold from Mexico and Peru and the spices and tea from far distant East Indian lands. From St. Thomas[2] these craft sailed the last long stretch to Europe in common strength and sometimes with

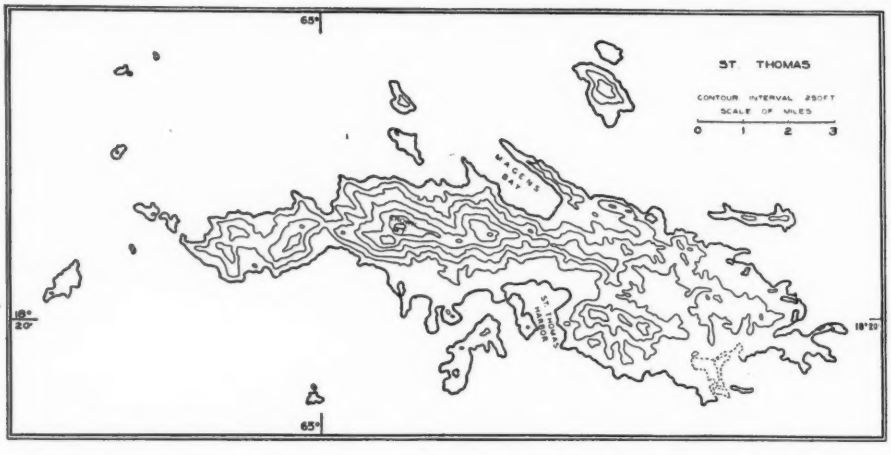

FIG. 2. Topographic map of St. Thomas. St. Thomas is an extremely rugged island. A mountain backbone extends in a general east-west direction thruout the island's length and north-south spurs branch from the axial range in several places. Submergence has produced an extremely irregular coast line. The map is drawn after the U. S. Coast and Geodetic Survey map of St. Thomas.

war frigate protection, a wise precaution in view of the many pirates who frequented the Caribbean waters at that time.

Like the Spanish, the "gentlemen of the black flag" took advantage of St. Thomas' favorable geographic environment. The strategic location which made the island a focal point for lawful commerce, assured the law breakers opportunities to single out and prey upon European vessels that were striving to reach the common goal. Moreover, not only the famous harbor but many other coastal

[1] Several writers have used the word "keystone" to describe the location of St. Thomas. Admiral Porter, U.S.N., spoke of the island as "the keystone to the arch of the West Indies."

[2] Other Antillean islands were used as assembling points for early European bound fleets, but St. Thomas, because of its location and harbor, was an important meeting place.

indentations (Fig. 2) of the submerged shore line afforded safe anchorage and good hiding places for the sea raiders. Sometimes, however, the lone Spanish ship sought a retreat from its pursuer in one of the forty or more inlets, and instances occurred in which the pursued instead of the pursuer profited by a safe haven along the island's irregular coast. Again, a number of gently sloping sandy beaches provided ideal places on which to careen a ship whenever repairs were necessary.

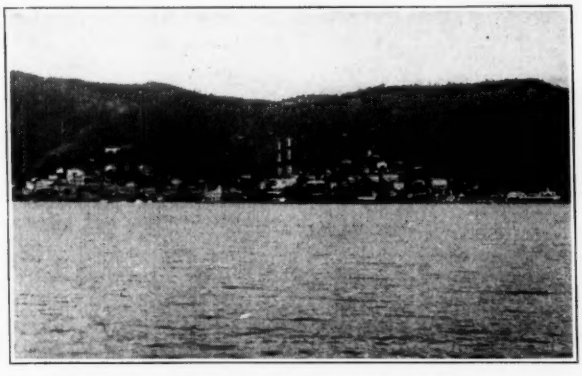

FIG. 3. The harbor and town of St. Thomas. Lying in the lee of an east-west mountain range, and almost landlocked, the harbor of St. Thomas is well protected from storms. Two periods of submergence in Quaternary time have provided ample depth for deep draft vessels and sufficient expanse to afford anchorage for many ships. The town forms a narrow fringe along the shore and rises house above house up the lower slopes of three mountain spurs. White walls and red roofs stand out sharply against the vegetation of the mountains in the background.

Besides the advantages of a good harbor and a strategic location, the position of St. Thomas in the tropics was another geographic factor of some importance in the island's early colonial history. Shortly after obtaining control of the island in the latter part of the seventeenth century, Denmark, like other European colonizers of low latitude regions at that time, encouraged sugar raising. For many years slave labor and high sugar prices in Europe enabled plantation owners to make profits in spite of the rugged topography, thin soils and inadequate rainfall. However, St. Thomas, unlike some other isles of the Caribbean, expanded sugar raising but little. In fact it was not because of any fitness for, and development of, plantation agriculture that St. Thomas became known thruout the world, but it was due to the deep, well protected embayment (Fig. 4) and the location at the bend of the Antilles nearest Europe which contributed important advantages to shipping. The heavy-walled warehouses[3] which extend from the water front to the

[3] The warehouses of St. Thomas were owned or managed by importing firms of several nationalities. Of the forty-one import houses that lined the bay in the 1830's, thirteen were English, eleven French, six German, four Italian and Spanish, four Ameri-

main street bear mute testimony to the thousands of tons of merchandise which were unloaded and re-routed in smaller cargoes to various Caribbean destinations. Moreover, St. Thomas was an important link in the African slave trade, and many cotton and tobacco planters in the continental United States procured Negroes from the hundreds of shiploads which were distributed from this Virgin Island market.

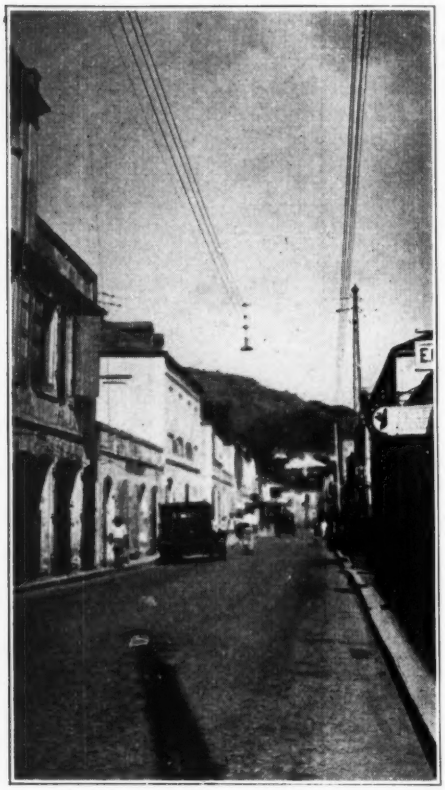

FIG. 4. Main street, St. Thomas. Heavy arcades front the buildings which line the main street of St. Thomas. Thick walled structures stand close together, each with an outside staircase which leads to an upper balcony where one may catch the breeze. Hurricane shutters may be seen swinging open on the building in the left foreground. The thick walls, heavy doors and strong shutters are an adjustment to the disastrous tropical storms which sometimes sweep over the island.

But the island market of today is different from that of a century ago. The entrepôt function is gone, fewer ships enter the harbor, most of them only to fuel, and considerable unemployment exists. All these changes have come about largely thru scientific, economic and political influences, the majority of which are beyond control of the local geographic environment. It is the writer's purpose to indicate the events that have brought about these changes, to describe the possibilities for readjustments, and to suggest the best capitalization for what always have been the island's most valuable geographic factors—a strategic location and a safe harbor.

INFLUENCES WHICH HAVE LED TO THE DECLINE IN SHIPPING

The invention of the steam boat brought the first major commercial setback to St. Thomas. With the steamship it became possible for other West Indian islands

can, and three Danish (W. Westergaard, "Danish West Indies Under Company Rule")—a grouping which illustrates the anthropo-geographic principle that island markets tend to have a cosmopolitan commercial make-up as well as a mixed population.

to import goods direct from producers, and as the more important Antilles developed commercially, each became able to import and export in full ship loads, thus gaining a release from entrepôt charges. The Panama Canal was another blow to St. Thomas' trade, and the ports of the canal, especially Colon, give strong competition in the fueling of vessels. About the time of the opening of the canal, the use of fuel oil lengthened the steaming radius of ships and cut still deeper into the bunkering business. In addition to these handicaps, foreign countries have developed West Indian colony ports which are competing for commerce thru the aid of patronage and subsidies. Again, the invention of the wireless and radio eliminated the necessity of vessels stopping en route for orders at strategically located points like St. Thomas. Moreover, improvements in refrigeration long ago settled the food problem for ships, and condensers make possible the production of fresh water from that of the sea. Finally, the change from Danish to United States sovereignty in 1917, while bringing certain economic advantages has undoubtedly entailed some commercial loss. It is no longer possible to use St. Thomas as an outfitting point for Latin American revolutions, a function it held for many years under Denmark's regime. No more does the Hamburg American Line attract vessels to the harbor, for soon after the United States purchase, Curaçao became the Caribbean terminus of the German shipping organization. This was a severe loss to St. Thomas, for before the World War the company had forty ships plying between European cities and West Indian points and brought

FIG. 5. Coal workers. The coal workers are standing around the coal pile during a lull in loading. The laborers are all Negroes, descendants of Guinea Coast slaves who were brought in to work the cane fields in early days. One of the electric cranes may be seen towering above, and in the background is the vessel waiting for fuel.

sixteen of these vessels to its docks each month. Moreover, it employed a thousand people in loading and unloading coal and general cargo and in carrying on its business up and down the South American coast. And lastly, the extension of the prohibition enactment, a product of American ownership, added another handicap to shipping.

THE PRESENT INDUSTRIES AND THE POSSIBILITIES FOR READJUSTMENTS

In spite of the imposing array of economic, scientific and political blows to shipping, boats still enter the harbor of St. Thomas—not to unload cargo for distribution, but to take on fuel oil or coal. Both modern and primitive means (Fig. 5) are utilized in the coaling of vessels. In the early days all steamers were coaled by man power, but now two electric cranes tower above the wharf and have taken over a part of the native's picturesque job. However, many ships have bunkers which are not accessible to the mechanical loaders, and the colored folks are still needed to supply these vessels with coal.

FIG. 6. Milk cows on the Tutu estate, St. Thomas. Most of the cattle of St. Thomas show better breeding than those of many tropical lands. Progressive cattle owners have imported high grade Ayrshire and Holstein sires from the states and crossed them with Senegal and Zebu bred cows. Two or three of the large breeders specialize in raising milk cows for the Puerto Rican market.

Cattle raising offers little opportunity for employment to the displaced coal or shipping worker, but it constitutes one of the major industries of the island (Fig. 6). Almost the whole eastern section, which is much less rugged than the western part, is planted to Guinea Grass and a few thousand cattle are raised, primarily for the Puerto Rican market. Rugged topography which inhibits plow culture, and low rainfall which is too marginal for commercial forests, encourage grazing, whereas low altitude and low latitude eliminate necessity for shedding. In spite of these favorable factors, periods of drouth, the tick and fever and a limited outlet, all characteristic handicaps

of a tropical wet and dry grazing region, suggest little opportunity for expansion.

Neither does bay rum manufacture offer employment to the idle stevedore. All geographers have heard of the three cornered trade between the United States Virgin Islands—how the bay oil of St. John and the alcohol by-product of St. Croix sugar meet in St. Thomas for the manufacture of bay rum. Yet this manufacture, which has increased from 10,000 gallons in 1910 to 138,000 gallons in 1931, provides employment for but seventeen workers, and while it is one of St. Thomas' most important industries it in no way compensates for the old entrepôt shipping.

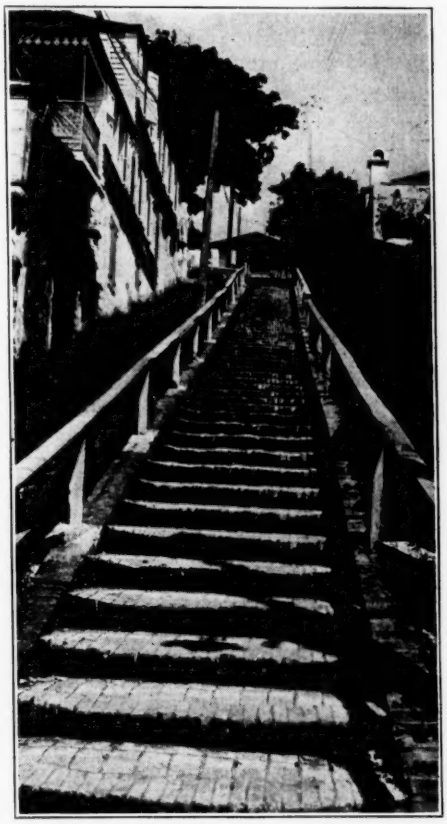

FIG. 7. A "stairstep" street in St. Thomas. Several of these streets may be seen thruout the town, and they form a unique feature of the old Danish city.

The decline in shipping and the niggardly geographic environment for agriculture have driven some of the people to seek a living from the sea. The waters above the wide submarine bank which surrounds the island abound in fish, yet types suitable for canning are not present in sufficient quantities for export. Consequently, the small demands of the local market limit the vocation to a hundred or more workers.

With fishing limited to a local market, with bay rum manufacture offering little chance for increased employment, with cattle raising near the limit of expansion, and with electric cranes taking the place of coal workers, the readjustment of St. Thomas to meet the loss of the shipping industry is no easy task. Furthermore, there are no stretches of arable land for plow agriculture, no valuable forest stand to provide materials for lumbering and woodworking, no minerals and power resources to furnish the bases for heavy manufactures. In the face of

this situation many people have left the island. Some have gone to continental United States, some have answered the call of higher wages on the Panama Canal and various Caribbean fruit and oil developments, and some have taken land on other isles of the West Indies with a more favorable agricultural background.

Yet the government is doing its best to bring about an economic equilibrium. It has shown little discouragement with the slow progress that is being made and with the many federal subsidies that have been necessary. Hand work industries that have added a significant export for Puerto Rico are being started. Homesteads on the small area of cultivable land are being provided for the agriculturally inclined. Tourists are being sought who may appreciate the island's well-known beauty, its salubrious climate, and its points of historic interest (Fig. 7).

But all the encouragement that is being given the present industries and all the attempts to exploit new ones will hardly result in a boom period like that of sailing ship days. Economically speaking St. Thomas is on the wane. The government may lessen the downward trend and cushion the fall, but it will be extremely difficult to bring about a commercial revival that will equal the prosperity of a century ago.

THE MILITARY VALUE OF THE HARBOR OF ST. THOMAS

The strategic location and splendid harbor which brought riches to St. Thomas' merchants in the early days attract little shipping under the changed conditions of modern time. And yet these geographic factors still retain a value that may be greater than any former or present economic appraisal. When one considers that as late as 1917 the harbor of St. Thomas was the magnet that drew the United States to purchase the Virgin Islands at an acre price eight times that paid for the Canal Zone and nearly fifteen thousand times the acre-cost of Alaska, one can realize the truth of the previous statement. The United States needed this deep embayment in the Civil War. Both British and French harbors in this area had been hospitable to Confederate cruisers and blockade runners, but Federal warships found it hard to obtain coal and shelter from storms. With a harbor like St. Thomas as a base for coaling, supplies, repairs and shelter, the United States could have rounded up privateers, blockade runners and contraband traders in half of the time and with half of the trouble. Again, the United States needed St. Thomas during the war with Spain. With this harbor in Ameri-

can possession, Cervera might have been barred from the Caribbean, Puerto Rico might have fallen into American hands more easily, the expense of hasty harbor defense need not have been incurred and the loss of life and money likely would have been reduced considerably. And finally, after many previous negotiations, the federal government did buy St. Thomas with the other Danish Virgins in 1917 when Germany was planning to use the harbor as a submarine base to prey upon the Allies' shipping. How much money and how many lives were saved during the World War by this expansion of United States territory in the Caribbean is not known, but in the minds of many the war value of St. Thomas is the real value of the Island. Tho of little economic importance the Antillean keystone possesses significant advantages both as an outer guardian to the Panama Canal and as an ideal site for a naval station in the Caribbean.

PHYSICAL-ECONOMIC GEOGRAPHY IN KANSAS CITY SENIOR HIGH SCHOOLS

M. H. SHEARER

It was with considerable satisfaction that geography teachers in Kansas City, Missouri, senior high schools read in the JOURNAL the opinions of so many American geographers who favored the classification of geography as a physical science. Such opinions are in agreement with the status of geography as taught in Kansas City secondary schools, not only at the present time but during the past twenty years.

Kansas City, Missouri, has a population of about 400,000, is situated somewhat near the geographical center of the country, and advertises itself as the "Heart of America." Greater Kansas City, which includes Kansas City, Kansas, and all suburbs, has a population well over half a million. Its geographical position gives the city a tremendous trade territory covering several mid-western states. Being near the border line between the western prairies and the corn belt the city is an important livestock market, especially in the buying and selling of cattle. Greater Kansas City ranks second in meat packing, and ranks high as a flour milling center and wholesale shipping point.

In Kansas City, Missouri, there are seven senior high schools, each with an enrollment of between 1500 and 2000 students. In six

of these seven schools a full year of physical-economic geography is offered. Kansas City has held fast to the above type of course because teachers and administrators believe that *the very foundation of all geographical study is a thoro knowledge of physical geography.*

In spite of the geography taught in the lower grades it is a recognized fact that many high school students possess a very meager knowledge of the earth and its peoples. Most high school history and geography teachers will agree on this point. Such being the case it seems logical to give the high school student first a foundation course in physical geography upon which he can build later courses in commercial and economic geography. To teach commercial or economic geography without first learning of the great variety of environmental conditions that exists on the various continents seems illogical. How can a student be taught "man's response to environment" when he knows nothing about environment? And how can he learn anything about environment without studying physical geography and biology?

Our full year course in the senior high schools is essentially physical geography. The textbook used is "New Physical Geography" by Tarr and von Engeln and the laboratory manual is *Laboratory Exercises in High School Geography* by the writer. The pure physical geography is modified by the addition of a certain amount of economic geography. For example, following the study of rocks and minerals there is a review of the natural resources of the United States and to a lesser extent of the world. Following the study of soils comes a study of the agricultural regions of the United States; after a study of the oceans, shorelines and seaports, a brief survey of international trade. The study of climate demands mention of the economic products of many regions. Toward the end of the year a week is devoted to the study of the physical and economic geography of the State of Missouri with considerable emphasis on the relation of geographical position and environment to the development of our own city.

Geography laboratories have been fairly well equipped during the past ten years, some better than others. The laboratory at Westport High School contains the following:

About 50 wall maps.

About 1000 contour maps.

Complete set of Finch commercial wall maps.

International trade maps (desk maps)—40 copies each for the more important commodities of commerce, such as wheat, wool, cotton, petroleum, etc.

A large relief model of the United States.
Eight relief models of small areas.
40 globes.
Andrew's tellurian.
A stereoptican with about 500 slides.
An unusually good collection of rocks and minerals.
Barometer, barograph, thermograph, and several hygrometers.
An eight-pointed switch attached to a wind vane on the roof connected with a series of eight electric lights in the laboratory to indicate the wind direction.
An anemometer on the roof so wired that each time it rotates an electric light in the laboratory flashes.
Copper tubing attached to a funnel on the roof brings rain water into the laboratory where it can be measured.
A case to house meteorological instruments, built outside one window.
Ten laboratory tables, 4 by 6 feet.
Several storage cases and two show cases for rocks and minerals.
Numerous books and magazines.

The teachers of this course in the various senior high schools have held meetings once a month for the past two years and have written a course of study with suggested student activities to accompany each unit of work. This course of study has been mimeographed and placed in the hands of each teacher. Such procedure makes for uniformity and is helpful to the student who moves from one high school to another. The writing of the course of study has been done under the direction of a specialist in curriculum revision employed by the Kansas City Board of Education.

A full year of physical-economic geography is of tremendous value to the student who expects to enter the field of commerce or industry, and of considerable value to those who may specialize in geology, geography, aviation, meteorology, civil engineering, mining engineering or transportation. By teaching a combination of physical and economic geography the course is made extremely practical and interesting. This is indicated by the number of students enrolled.

MAP PROJECTIONS AS A BASIS FOR MAPS*

GUY H. BURNHAM
Clark University

In the average school room no piece of equipment is more generally used than maps. It is, therefore, essential that teachers should know something of the problem involved in map making so as to be able to interpret the finished product correctly to their classes.

THE PROBLEM OF MAP PROJECTION

Since the earth is generally considered to be a sphere, the major problem presented in map making is the question of representing the surface of a sphere upon a plane. This is a vital consideration since no portion of the surface of a sphere may be spread out into a plane without stretching or tearing. This simple mathematical fact may be easily illustrated to a class by attempting to flatten a section of a hollow rubber ball; the outerpart must be stretched or torn before the central part can be brought into the same plane. Because of this property, a sphere is said to be a non-developable surface, while surfaces which readily lend themselves to such spreading without distortion are said to be developable. Of the latter the cylinder and the cone are well known; and as we shall later see, are widely used in map projection work.

With the major problem thus in mind, we can readily see that the terrestrial globe gives us the only accurate picture of the earth's surface for on it are shown true to scale both the area and shape of the various features. Conversely, it is also obvious that no flat map can represent the earth's surface correctly in every particular. Thus it comes about that some maps show area correctly at the expense of shape; others are orthomorphic or right in shape but incorrect in area; still others attempt to compromise and are correct in neither of these details; while others are almost true except for small areas only. These shortcomings in maps would soon be overcome if it were possible to fit a piece of paper over the globe, trace upon it the desired outlines and then spread the same without distortion into a flat surface again. However, the paper cannot be made to fit the globe and so some system has to be adopted for transfer-

* The reader should have an atlas at hand in order to appreciate the differences in the types of projections described. In making reference to the Oxford Advanced Atlas the author has used the second edition revised in 1924, and to Goode's School Atlas the first edition of 1923.—EDITOR.

ring, according to rule, the various details from the globe directly to the plane surface which now becomes the map or else to some developable surface which when unrolled forms the map.

In such transference a very important feature is the network of parallels and meridians that are drawn upon the globe. Since these lines help us find our way about on the globe by giving us the latitude and longitude of every geographical feature, it is evident that if we had them properly drawn on a plane surface, the outline of a continent could be sketched in from information given by surveyors as to the latitude and longitude of the principal capes, inlets or other features. Our problem then resolves itself in finding some method of transferring the meridians and parallels from the globe to the map and that method is the map projection. Hence we come to define a map projection as a systematic drawing of meridians and parallels for the whole earth or some portion of it on a plane surface.

The Perspective Type of Projections

There is a very large number of map projections—in fact so many that only those in general use can be considered here. These fall into various groups, one of which is the perspective type and its modifications. In this group let us imagine a transparent globe having on it an outline map of the world and a network of lines representing parallels and meridians. By means of an imaginary light the shadows of the lines and map or some part of it may be projected upon a surface which may be either a plane, a cylinder or a cone, the last two becoming plane surfaces when unrolled. The shape of the shadows projected upon any of the above surfaces will vary according to the position of the light. Since the projections upon a plane surface have but little practical use today, we shall pass directly to those that are developed upon a cylinder.

Here, the cylinder is supposed to encircle the transparent globe, and to be tangent to it, the inside surface of the cylinder touching the surface of the globe all around at the equator. Upon development of the cylinder, it will be noted that meridians and parallels are projected as straight lines, meridians being always equidistant and at right angles to parallels. In all of these projections, every parallel has the same length as the equator and as a consequence excessive horizontal stretching occurs. Distances between parallels will vary. In the central cylindrical projection, with the eye in the center of the globe, such distances increase enormously from the equator, the poles being at infinity; while in Gall's cylindrical equal

area projection, with the eye at infinity, parallel spacing decreases rapidly from the equator; the poles being shown by straight lines of equal length to the equator. Thus in the former projection, there is a great north and south stretching, while in the latter compression occurs in the same direction.

Because of these properties none of the above projections are commonly used but it is well to bear them in mind since they serve as a basis for two well-known modifications—Mercator's projection and Gall's stereographic projection.

Mercator's projection which occurs in almost every atlas and textbook at least once is a familiar sight to most of us, its grill being composed of two systems of parallel lines that are mutually perpendicular. Distances between meridians remain constant, while distances between parallels, northward and southward from the equator, are increased on the map in the same ratio as the distances between meridians diminish on the globe. As a result we have a rapid increase in scale with increase in latitude, continental shapes are badly distorted and areas enormously expanded in higher latitudes. This projection is, however, orthomorphic as to details of coastline; and since a true bearing may be had from any point, it is of great value to the mariner for whom it was originally invented.

Gall's stereographic projection is used widely in English publications for world maps (Oxford Atlas, pages 10-11) but is not so well known in America. In this projection the cylinder intersects the globe at parallels 45° North and South midway between the equator and the poles. When developed, the grill exhibits many characteristics similar to the Mercator, the chief differences being smaller exaggeration in spacing between the parallels and the fact that the poles, tho greatly exaggerated, are represented.

In the conic projections, the cone is either tangent at the earth's surface or intersects the sphere. With the eye at the center of the sphere, the earth's surface is projected into the cone which is then developed. Meridians become straight lines equally spaced and radiating from a center which was the apex of the cone. Parallels are arcs of concentric circles which cross all meridians at right angles as on the globe.

With the cone tangent to the sphere, the map is correct only in the parallel of tangency, scale and areas increasing with distance from that point. In the intersecting phase the cone cuts the sphere in two parallels of latitude. The map is correct on these parallels;

beyond them scales along parallels are increased; while between them there is a decrease.

These two projections, together with a modification known as De Lisle's Conic which is evolved from the intersecting phase, are readily adaptable to small areas everywhere as a look thru either Goode's School Atlas or the Oxford Advanced Atlas will reveal.

We must now consider the polyconic projection (Goode's School Atlas, pages 30-31), which is constructed on the principle that a separate cone touches the globe at each parallel. Consequently, each parallel is correct, and the parallels are not arcs of concentric circles, for each has its own center; they are equidistant along the central meridian diverging eastward and westward from it. On the parallels true distances are marked for meridian spaces in either direction from the mid-meridian which is a straight line and thru these points smooth curves are drawn for meridians. This projection, which was developed by the United States Geological Survey, gives a very close approximation to equal area.

A modification of the simple conic projection is found in Bonne's projection. The angle of the cone is determined so that the surface may touch the globe along a parallel near the center of the area to be mapped. Parallels are all drawn to true scale length as arcs of concentric circles thru points dividing equally the central meridian which is a straight line. Each parallel is equally divided for the several meridians which are smooth curves converging to the poles. As a result we have an equal area projection which is frequently used in atlases for small areas as well as for Asia, North America, and other continents (Oxford Advanced Atlas, pages 60, 64, 65, 78-79, 80, 82-83, 88 and 90-91).

Closely related to Bonne's projection in many ways is Werner's projection. The mid-meridian is a straight line upon which true distances are laid off for latitude spaces. Thru these points concentric arcs of circles are drawn for parallels with the north pole as a center. Upon these parallels, true distances are laid off for meridians which are smooth curves converging at the pole. This is an equal area projection that is well adapted to a continent like North America which extends into high as well as low latitudes (Goode's Wall Map of North America, Physical Series).

THE ARBITRARY TYPE OF PROJECTIONS

The second group of projections which merits our consideration is the arbitrary or mathematical. Of these the sinusoidal (some-

times called Sanson-Flamsteed) is one of the best known. In this projection a straight line is drawn equal to equator scale length and at right angles thru its center is a line equal to the scale length of a meridian. The meridian line is divided into equal parts and thru the points thus established straight lines are drawn to true scale lengths for parallels. These parallels are equally divided and thru these points meridians are drawn as sine curves. As a result we have an equal area projection which is valuable for small areas everywhere and for large areas in low latitudes near the mid-meridian. For Africa and South America there is no better projection (Oxford Advanced Atlas, pages 69, 70-71, 72, 86-87 and 96).

An arbitrary projection which readily adapts itself for use for maps of the hemispheres and all the continents is Lambert's azimuthal equal area projection. Its polar phase is very easy to construct in that the parallels are concentric circles and the meridians are straight lines radiating from the center of the map which is the pole (Oxford Advanced Atlas, pages 8 and 9; Goode's School Atlas, page 5). In the equatorial phase, which is difficult to construct, meridians are represented by arcs of circles converging to the pole, their distances apart diminishing eastward and westward from the central meridian which is a straight line. Parallels are represented by elliptical curves whose distances apart along the central meridian diminish toward the poles. This projection is strictly equal area and gives the best distribution of errors in angles and hence continental shapes are also good (Goode's School Atlas, pages 2, 3, 18, 54 and 78-79; Oxford Advanced Atlas, pages 58-59).

The Homolographic or Mollweide projection is in the form of an ellipse having its major axis (the equator) twice the length of the minor axis (the mid-meridian). The parallels also are straight lines their distances apart diminishing towards the poles; the areas between parallels being proportional to the areas between the same parallels on the globe. The meridians are equidistant and are ellipses with the exception of the mid-meridian which is a straight line and of one which is a circle. This is an equal area projection on which the whole earth's surface can be shown. It has, however, serious faults in that there is no uniformity of linear scale, the arcs of latitude being progressivly shortened from the equator to the pole. Shapes are distorted especially in the far margins of the map where angles become very acute (Oxford Advanced Atlas, pages 18-19).

A study of the homolographic projection reveals that near the equator and near the mid-meridian all the elements of the map, especially shapes and areas are fairly well presented. With this idea in mind, the late Dr. J. Paul Goode of the University of Chicago, in 1916, proposed a method of interrupting the world map which largely corrects distortion of shapes in continents. This is done by giving each continent the advantage of being balanced upon a mid-meridian of its own, the grill being parted thru the adjacent ocean to make this possible (Goode's School Atlas, pages 10-11). This has also been done for the oceans, continents having been split to allow the adjacent ocean a mid-meridian of its own (Ibid., pages 14-15).

Altho an excellent map resulted in either of the above cases, Dr. Goode continued further studies in this interrupted type of grill and in 1923 brought out the interrupted homolosine projection. As can be seen from the name, this projection is a combination of the homolographic and the sinusoidal. By representing the surface of the same globe on these projections and by superimposing them, Dr. Goode found that there is a point near 40° N. and S. latitude where the linear scale of each is identical. This enabled him to use the sinusoidal projection with all its fine characteristics for the entire earth up to the critical latitude of equivalent scale. Beyond this point the grill is finished out with the homolographic projection. In interrupting this grill for either the continents or the ocean, the same plan that was used in the interrupted homolographic is followed. The resulting grill has straight lines for parallels and smooth curves for meridians except near 40° N. and S. latitude where a little jog occurs at the point where the two projections are fused. This is the outstanding difference between the grills of these two interrupted world maps. A further study of these characteristics can be made by consulting Dr. Goode's Physical Wall Map of the World on the homolosine projection.

There are many other map projections in existence but we cannot mention them here. Those that we have discussed are used frequently both in atlases, and geography textbooks and also for wall maps. To appreciate these projections fully one should draw them, but details of methods of construction must be left to a regular course in cartography. However, if by our discussion of the various types of frameworks that form the bases for maps, the interest of the reader is so aroused that whenever he confronts a map, he looks at the grill to see what projection has been used, then the purpose of this article has been achieved.

WILLIAM MORRIS DAVIS—AN APPRECIATION

William Morris Davis, the Dean of American Geographers, died after a very brief illness at Pasadena, California, on February 5 last, within a week of his eighty-fourth birthday, leaving a heritage of accomplishment in the fields of geography and geology that can never be evaluated. He was our leader for fifty years, and during his long life of productive investigation and publication he exerted a greater influence on scientific geography and on educational geography from the elementary school to the university than has any other American scholar.

As he himself expressed it when he received the Penrose Medal for his contributions to geology—the highest recognition that can come to a geologist—he followed two maxims, "go and see" and "see and think," and his travels led him to every continent except Antarctica.

In the summer of 1883 he went to Montana for field work. There he found a region with a plain-like surface that had obviously been produced by subaerial erosion forces. That sight, followed by exact and critical thinking, gave to the world the concepts of the peneplain and of the cycle of erosion now universally used in physical geography studies.

From his first memorable paper, on the Rivers and Valleys of Pennsylvania in 1889, to his last published study on the Glacial Epochs of the Santa Monica Mountains in California, which appeared late in 1933, Professor Davis was ever perfecting his thinking and widening the application of his theories in the interpretation of the land forms of the earth.

He gave as his special fields of research the physical geography of the lands and coral reefs, and yet, fundamental as his work was and is in these fields, Professor Davis' valuable contributions were by no means limited to the lands and seas. He first organized the principles of modern meteorology, and his textbook for many years was the standard reference volume in meteorology in this country. He also contributed several significant studies in structural geology, and used the principles of geologic structure as important factors in interpreting the history of land forms.

Enthusiastically interested in the spreading of the newer concepts of physical geography, Professor Davis contributed over many years a series of papers on educational geography from the grade school to the university, and found time to prepare and pub-

lish many practical aids for teachers. At the same time he was encouraging others to aid in the promotion of better geography teaching.

With his cooperation the original Frye geographies forty years ago first brought the modern concepts of physical geography into the elementary schools. The late Professor Tarr, one of the earlier of Professor Davis' pupils, by his two high school texts introduced the new physical geography into secondary schools and laid a background for the later great success of the Physical Geography written by Professor Davis in collaboration with W. H. Snyder, now of California. In 1897, the writer, on Professor Davis' initiative and almost insistence, established the JOURNAL OF SCHOOL GEOGRAPHY to aid teachers of geography in schools. This journal later became the JOURNAL OF GEOGRAPHY. Professor Davis founded and was twice President of the Association of American Geographers. He was in 1911 President of the Geological Society of America, founded the Harvard Travelers Club, and in many other ways stimulated the promotion of geography thru societies and organizations.

But the life work of Professor Davis was as a university teacher, for he taught at Harvard University from 1877 until his retirement in 1912 as Emeritus Professor. Since that time he has carried on field work in the southwest and been almost constantly teaching at universities in Arizona, California, and Oregon. Among the older geographers who gained an interest in geography largely thru the inspiration received from their teacher are Jefferson, Bowman, Marbut, Cobb, Johnson, Martin, P. S. Smith, and the late Professors Brigham, Tarr, and Ward.

All who have had the privilege of being one of his major students will agree that Professor Davis was a great teacher. Endowed with a remarkable power of oral as well as written exposition, his lectures were always logical, precise, and clear. Holding himself to a high standard of performance, he demanded that his students should learn to test their thinking and be self critical in all their work. With a keenly trained scientific imagination, Professor Davis was ever opening up new vistas in his subject and encouraging his students to explore new fields of work and new methods of precise study.

In spite of his seeming severity in the classroom, those who came to know Professor Davis found him one who was deeply interested in youth as young men and he never let this interest flag. His occasional post cards of cheer, admonition, or suggestion to those who

had worked with him have brought frequent joy to many of us who thus knew that he was ever ready to help us in our life work. Personally he was a delightful life friend, a genial host and playmate, for he had the unusual ability to play as hard as he worked.

Perhaps the spirit of the man is best shown in the address he gave in Boston at Christmas on the Faith of Reverent Science. Here we find clearly and honestly expressed his life philosophy that perhaps gave to many their first appreciation of the deeply religious and sincerely human scientist and teacher.

Tho Professor Davis had received many honors and medals from geographic societies both here and abroad, and complimentary degrees from universities in three continents, his greatest satisfaction came from knowing that his friends and colleagues had found his work and influence of personal help to them. He prized especially the Distinguished Service Award from the National Council of Geography Teachers a year ago, for this was a recognition not only of his work as a geographer, but of his stimulating leadership in geographic education, and this is the phase of geographic work that influences the lives of people the most. Hence, the satisfaction he gained from recognition of his work in this field.

The National Council in honoring Professor Davis with its first award added honor to itself and set a standard for the award that few can ever hope to attain.

RICHARD ELWOOD DODGE

IN THE TEA GARDENS OF ASSAM

ERNEST YOUNG
London, England

Note: Tea will serve to introduce us to the type of hot lands known as the monsoon regions. The bulk of the world's supply of tea is derived from India and Ceylon and, in India, Assam is the most productive region.

In preparation for what follows, children should be asked to bring (1) packets that have contained tea, and (2) the dried contents of ONE pot. The dried leaves having been spread out, by each pupil, on a piece of paper, the teacher proceeds somewhat as follows:

The tea we drink is made from leaves, lots of leaves. Think of the number of leaves in this classroom at this minute and remember that they were all obtained from one pot in each house and for one meal only. Now think of all the people in many parts of the world who drink tea two or three times a day and all the year round. They use more leaves than would fill the whole of this school if you packed it from floor to ceiling and filled up every corner.

So many leaves can come only from countries where there is plenty of sunshine and plenty of rain. In our own land it is in summer, for instance, that our trees are most thickly covered, and even then, if there be no rain, the leaves tend to wither and fall.

Tea, then, can be grown only in lands that are both *warm* and *wet*. The names of the chief of these lands—India, Ceylon, and China—are printed on the packets of tea that are sold at the grocers' shops. But to-day we will talk about part of only one of these lands—the land of India.

India is so big that it contains many kinds of people: some of them have fair skins, not much darker than yours; others are brown, and there are some who are nearly black. It also contains many kinds of country: some parts are so dry as to be desert; others have plenty of rain and are covered with forest. The part of India where most tea is grown is called Assam. Here there are very heavy rains in summer and showers in the spring, and during the rest of the year, when there is no rain, there are thick fogs in the morning that bring some moisture. Assam, unlike some other parts of India, is always green.

The tea plants are raised from seed in nursery beds much as we sometimes raise some of our vegetables and flowers. When they are about six months old they are removed and planted out in what is called a tea garden, in long neat straight rows, each plant about five feet from the next. When they are old enough they are pruned

to keep the bushes low, broad and flat; if this were not done they would grow into trees fifty feet high, and it would be difficult to pick the leaves. A tea garden, in the distance, looks like a huge bed of very big cabbages. Because there is always plenty of sunshine and nearly always plenty of rain, there are nearly always plenty of leaves, and they can be gathered for nearly nine months in the year. The picking in Assam finishes in December.

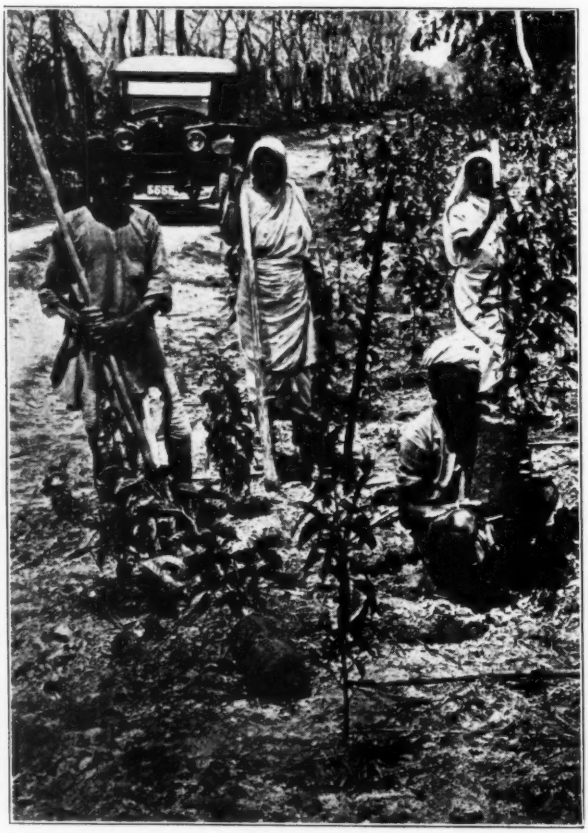

Fig. 1. Planting young tea trees. Courtesy, Imperial Institute.

The leaves from which tea is made are all picked by hand; for the best kinds, only two leaves and a little bud at the end of each shoot are picked at one time! Even for the cheap teas only three or four leaves are picked at a time! Think of the hundreds of people who must work to pick all the tea leaves that are used by people in many parts of the world, just two or three at a time. Who are they?

Cocoa and bananas are grown by black people: sago and coconuts by brown people. Tea is also grown by brown people but the owners and managers of the tea gardens, like the owners and managers of the rubber plantations are almost all English. The brown workers in the tea gardens of Assam are not the Assamese themselves: there are no rich Assamese, but neither are there any poor. Nearly every man owns a piece of land where he grows rice and other kinds of food, and he can catch fish in the rivers and shoot birds in the air; so he will not work for wages under a master. The people who do the hard

work in the tea gardens, the *coolies*, as they are called, come from other parts of India. It is not easy to persuade them to leave their homes and go to live in Assam, many days' journey away. So besides their wages, which are very small, each coolie is given a new blanket every year and, very often, an umbrella for use in the wet weather.

In the tea gardens men, women and children are all busy, for there is plenty to do, from the beginning to the end of the year. Under the burning sun and in the moist earth weeds grow very quickly, and, unless they are removed, would soon choke the tea

FIG. 2. Cultivating tea by hand methods. Courtesy, Imperial Institute.

plants. The work of weeding is done by men, armed with a kind of rake. The coolies are usually rather thin and do not look very strong. The heat is tiring, and when the rains are heavy they may be up to their knees in water and mud, and they suffer sometimes from fever.

The picking is done by women and children because they have such nimble fingers and can pick off the two leaves and the bud without doing any harm to the plant itself.

While in the gardens the coolies wear long strips of cloth over their heads and down their backs to guard them against sunstroke. The white managers wear thick pith helmets for the same reason: their other clothing is a kind of cricket shirt and a pair of shorts.

As the leaves are picked they are placed in a basket which is carried by means of a strap passed round the front of the head. When the baskets are full they are taken to the factory, a long,

low building made of wood and roofed with corrugated iron. In the factory the leaves are spread out in shallow trays and left to wither. Next morning, they are put into a rolling machine, out of which they come in about half an hour's time as a big wet mass. This mass is broken up, spread out to dry, and left for some time. Later on, it is thrown into a machine where it is further dried by hot air and becomes the brittle stuff that we buy in the packets.

FIG. 3. Pruning the tea bushes. Courtesy, Imperial Institute.

Another machine sorts out the big leaves from the little ones, after which they are then dried again, taken to a warehouse, and packed in wooden chests that are lined with lead to keep them dry.

It is clear that there can be no tea for anyone to drink till a great many people have done a great deal of work and have done it in hot, damp air that would make most of us ill if we tried it for only a few days. Most of them, as we have said, are brown people from other parts of India; there are only a few hundred white Englishmen in the whole of Assam.

But sun and rain are not the only troubles. Sometimes a big snake may be hiding under the bushes. When he pokes his flat head out and shows his wicked eyes the coolie certainly gets a fright and he may, if he is unlucky, get a bite that kills.

Outside the gardens, in the forests, are tigers and wild elephants. Sometimes an elephant is turned out of the herd and has to go to live by himself. He then hangs about places where people live and tame elephants are kept, and in the night he may push down the wall of a hut in which a coolie is sleeping or lift the roof off the kitchen that belongs to the white manager. Or he may hide

in the edge of the jungle, step out as a bullock cart passes, pull off the driver and kneel on him.

The tame elephant is a much more pleasant beast, and its babies are as playful as young lambs. It has two servants, a driver and a leaf-cutter to bring it food. Twice a day one of these men must take it down to the water and scrub it all over with an old coconut shell or half an old brick, while it lies in the water and turns over from one side to the other as it is told.

You may sometimes see a fat little boy only five or six years of age, walking about on the elephant as it lies in the water, or

FIG. 4. Bringing in the plucked tea leaves. Courtesy, Imperial Institute.

scrubbing its cheek with a brick. When the bath is finished, the child will scramble over the elephant's head, slide into place on the neck, and bring the beast up the bank as if he were sitting on a very quiet pony.

In the waters of the river, where the people bathe and the women do the washing, there are crocodiles and rhinoceros. Everywhere there are mosquitoes that bite, ants that sting like a red hot needle, and many other kinds of harmful insects.

Once upon a time there was another kind of danger. In some of the hills in Assam there are people who are very wild. One tribe has huts on the ground for use during the day time but sleeps

at night in bamboo shelters that are built up in the branches of strong trees where they are out of reach of the tigers and the wild elephants. Many of these hill tribes are fond of fighting and, at one time, used to make attacks on the tea gardens and kill any brown or white people they could find. To put a stop to these attacks there are now small numbers of police, who are more like soldiers than policemen, at different points.

The tea planter, as we have said, is usually an Englishman. He and his few white helpers live in bungalows built of wood, with big rooms so that they can have plenty of air, and covered with sound roofs to keep out the heavy rain. These are usually close to the factory buildings and set in the midst of tennis lawns and gardens of flowering shrubs.

The planter's life is lonely, tho he tries to meet white people from other gardens once a week if possible. He has very few amusements except tennis and shooting. He may have a motor car, but he cannot travel very far in it for the roads in the tea district are usually very bad. They are not paved or made up in any way. They are just the bare earth, thick with dust in the dry season and with mud in the wet. During the wettest weather the only thing that can travel along them is the slow, creaking, jolting bullock cart.

Each tea garden is something like a little village in itself. Besides the bungalows and the factory there is a tiny hospital and a school for the brown people and their children and "lines" of houses where they live. The coolies' huts have walls of wood or of reeds plastered with mud, and roofs of thatch spread over bamboos: they are very small and are usually without windows, to keep out the hot sun. For the use of these houses, for the fuel they burn and for doctors and medicines the coolie pays nothing: these things are part of his wages.

The floor is the bare earth and the fireplace is only three or four bricks. The bed is a rough wooden frame across which are stretched a number of ropes, or perhaps it is only a mat on the floor. At night frogs croak inside and outside, mice run about in the thatch of the roof and lizards run up and down the walls.

There is very little furniture, but the women and girls wear gold and silver rings upon their fingers, wrists and ankles: this is the way they save their money. They put it on their bodies and not into banks.

GEOGRAPHICAL PUBLICATIONS

Arnold Heim. **Minya Gongkar.** Hans Huber, Bern-Berlin. 244 pp., 150 illus., 1933.

Along the eastern margin of the Tibetan massif are some of the least understood mountains of central Asia. Their remoteness from the seacoast, their rugged impenetrability, and the hostility of their tribesmen have combined to keep out explorers. The few Europeans who have seen these tremendous snow ranges have been impressed by their great height and some have suggested that the highest elevations might even exceed Everest. On clear days certain of these peaks are visible from the Chengtu plain in Szechwan.[1]

The examination of these peaks was the objective of an expedition from Sun Yat-sen University in Canton led by Professor Arnold Heim of Switzerland in 1930-1931. The party travelled by way of Yunnan and Tatsienlu into Chwanpien, returning by way of the Yangtze and Shanghai. Both geologic and topographic studies were carried on. What was previously thought to be the highest of the peaks, Mount Ja-ra or Zhara, to the north of Tatsienlu proved to be but 5930 meters, 19,455 feet, while a great pyramid resembling the Matterhorn and south of Tatsienlu was established as the highest mountain in all China. Based on the Tatsienlu datum of 2600 meters, Professor Imhof of the Expedition credited this peak with an elevation of 7700 meters, 25,262 feet.

This mighty mountain is Minya Gongkar, a peak first measured by Szechenyi as 7600 meters and variously called Bo Kunka, Bang Gangs t'Kar, and Minya Konka. Heim took especial pains to ascertain the correct pronunciation from the abbot of a nearby lamasary, and his spelling was based thereon. Unfortunately Heim met with exceptionally bad weather and was unable to reach the summit; he was nevertheless able to make extensive studies of the region.

Minya Gongkar is a magnificent book of travel and description. Its 150 beautiful half-tones are supplemented by numerous maps and sketches, providing a vivid portrayal of life amid these tremendous mountains. A half dozen photographs in color form a striking addition. The volume deals with much more than the mountain, for only 60 pages out of 244 deal with Minya Gongkar itself.

The assault on the summit which Heim was unable to make was successfully accomplished by a party of Americans on October 28, 1932, consisting of Richard Burdsall, Arthur Emmons, III, Terris Moore, and Jack Young.[2]

GEORGE B. CRESSEY

Syracuse University

Ben F. Lemert. **The Cotton Textile Industry of the Southern Appalachian Piedmont.** 188 pp. University of North Carolina Press, Chapel Hill, North Carolina. 1933. $2.50.

The New England Cotton Textile Industry by J. Herbert Burgy (Reviewed in Vol. XXXI, No. 9, Dec. 1932, p. 392) and the present volume present an almost complete picture of the cotton manufacturing industry. Both volumes are the outcome of

[1] The Mountains about Tatsienlu, *Geographical Journal,* LXXV (1930), 345-356. J. H. Edgar, Notes on the Mountains about Tatsienlu, *Geographical Journal,* LXXXII (1933), 264-266.

[2] Richard L. Burdsall, The Altitude and Location of Minya Konka, *Geographical Review,* XXIV (1934), 118-128. Their surveys give the peak an elevation of 24,891 feet, 7587 meters, and their preferred spelling is Minya Konka. This is said to be the highest peak ever climbed by Americans and the second highest summit which has ever been scaled outside the Himalayan area.

intensive and extensive investigations over time and space and they carry well-balanced analyses of the situation in the two sections. It will be particularly interesting to watch the development of the two areas since New England has tended towards concentration of mill sites and has large manufacturing centers, while the Piedmont, according to Lemert, is leaning strongly towards decentralization. There is an opinion in certain quarters that the way out of our municipal difficulties and the hope for a saner life lies in a movement towards the dispersion of manufacturing and population to suburban villages. Thus, the two cotton sections, if the trends mentioned above persist, will serve as laboratories of experimentation.

Lemert after an extensive and logical presentation of the locational advantages of the Piedmont, including ample labor, cheapness of labor, construction costs, and transportation, has two chapters on the trend towards centralization which may negate the idea that decentralization of industry will continue in the Piedmont. Influencing the Piedmont to centralization are factors of trained labor, housing facilities, power facilities, transportation, and the attraction of dependent and parasitic industries; while a trend towards larger factories and mergers is likely to be promoted because of increased availability of capital, changing markets, and lowering prices. If these influences dominate in the Piedmont, the differences between New England and Southern manufacturing of textiles will be greatly reduced.

The book includes in addition a brief history of the development of the Southern textile industry, and exposition of the changes in textile manufacturing, and an analysis of the present state of the industry. It is highly recommended to all interested in the textile situation and particularly to students of economic geography.

ROBERT M. BROWN

Rhode Island College of Education

George Babcock Cressey. **China's Geographic Foundation: A Survey of the Land and Its People.** 436 pp. Maps and Illustration. New York, McGraw-Hill. 1934.

Professor Cressey has given us an excellent geography of China. His book admirably meets the long felt need for an up to date, accurate, and readable compendium on the land and people of China. It should remain the standard authority and text in the field for years to come and largely takes the place of Father Richard's classical work, "A Comprehensive Geography of the Chinese Empire and Its Dependencies."

Dr. Cressey is to be particularly congratulated for his skillful blending of the two current and somewhat opposing points of view, i.e., geography as the study of (1) landscape and (2) relationships. With a similar skill he has correlated his own extensive field studies in China with the data he has drawn from the extensive and varied literature on China. The organization is admirable as are the numerous maps, photographic illustrations, bibliography, and statistical tables.

The book begins with the general heritage of the Chinese people and the broader geographic character and relationships of the land of China. Next follows a more detailed description of the physical character of the land. Then is pictured the mode of life of the people. Following this, individual chapters are given over to each of the fifteen major regions of China.

One of the high points is the chapter entitled, "Farmers of Forty Centuries." A most excellent and intimate treatment of Chinese agriculture and agricultural problems is made. One of the low points is the chapter, "Topography Sets the Stage." Realizing the difficulties of presenting the facts of surface and relief of so large and diversified an area as that of China in a few pages, to the reading public or in fact to many geographers, yet this chapter is disappointing. An overwhelming array of place names are presented but there is little interpretation of the surface forms named.

The reviewer would also like to question a few statements of fact such for example: (1) In describing the summer monsoon Dr. Cressey states that "The reduced pressure over the interior resulting from this outflow causes warm moist oceanic air to be *drawn in* along the surface to fill the partial *vacuum*," and (2) "The Kun Lun system continues eastward into Japan . . ."

Laying minor criticism aside, Dr. Cressey's book is to be completely recommended. He has undertaken a most difficult task and has done it well.

R. B. HALL

University of Michigan

R. H. Whitbeck and Olive J. Thomas. **The Geographic Factor.** 422 pages. Illustrated. The Century Company, New York, 1932, $2.25

The rôle of environmental conditions in the development of life and civilization is the subject of this book on "The Geographic Factor." In the fields of ecology, anthropology, anthrogeography, history and the other social sciences there has developed voluminous literature dealing with the geographical factor and its application, but there still remains much misunderstanding in regard to the significance of the physical environment. Professor Whitbeck and Miss Thomas have surveyed these several fields of knowledge and present in readable form the substance of an extensive literature. They disclaim any belief in geographic determinism. They insist, and reiterate again and again, that the geographic environment has been a passive factor in the evolution of life and human society. There is no escaping the fact, however, that in many activities of man, particularly the economic, the physical environment is of fundamental importance. It is in this field of economic geography that the geographer has a great opportunity to develop the philosophy of significant correlation between earth conditions and the utilization of the land and its resources.

This discussion of the geographic factor has been prepared for an "orientation course in the social studies," and is written especially for the student entering upon his college career. This explains the elementary consideration of subjects as, The Adaptation of Organisms to Their Environment, Man's Adjustment to His Planet, Climate and Man, and Climate and Its Economic Relationships. Certain particular features of the natural realm have been singled out for special treatment. The chapters on Rivers and Valleys and Their Service to Man, Man's Adjustment to Plains, Geographical Barriers and Human Activities, and Island Life and Insularity, recognize the importance of geography in the location of urban centers and in the development of agricultural and other economic activities.

In the development of our modern civilization man has increased materially his utilization of the mineral resources. To this subject are devoted three chapters entitled, Available Materials and Human Progress, the Revolutionizing Influence of Coal and The International Importance of the Location of Petroleum Fields.

In a single chapter—Environment, Racial Character, and Religious Beliefs—the authors discuss in a general way such subjects as the influence of geographic environment upon national character, the Arab and his environment, the highland Celt, the influence of natural environment upon literature, factors in religion, friendly and unfriendly gods, paradise, and faith and phenomena. These numerous items illustrate the breadth of the treatment and the ramifications of the subject under discussion.

The evaluation of the geographic factor is concluded by a review of the Geographical Influences in the Forming of American National Character, and Adjustments to the World Environment: Examples from South America. These two chapters give particular emphasis to the problems of the New World where the relations of human activities to the national environment are not so complicated as in Europe and Asia.

The authors in preparing this book have searched a variety of sources and many of

the most useful references are listed in a general bibliography. Among the authors cited the name of Ellen Churchill Semple occurs more frequently than any other, and deservedly so. In fact this work may be regarded as a memorial to her, for it was her "Influences of Geographic Environment" which introduced the philosophy of Ratzel to the English speaking public. In addition to the brief general bibliography the authors have listed at the end of each chapter several useful references with specific chapters given in the case of general works. This is a vaulable aid to a teacher in making up reading lists.

The teacher of geography and the social sciences will find "The Geographic Factor" a very useful reference, and the general reader who is interested in the development of the philosophy of geography will profit by a careful study of this excellent survey of the subject. The advanced student of geography and related fields will find little that is new, but he must remember that this book was not prepared for him.

GUY-HAROLD SMITH

Ohio State University

F. F. Elliott. **Types of Farming in United States.** 225 pp., 48 maps in text and 2 in pocket. Bureau of Census Pub., Gov. Printing Office, Washington, D.C. 60 cents.

This publication sets up a new method of classifying agricultural activities. The types developed are somewhat in contrast with the old forms—Corn Belt, Spring Wheat Region, etc.—which we have been using for many years, altho, in some instances, the dominant crop establishes the type. The geographic basis of the study is well stated as follows: *This tendency of farmers to adjust their organizations and practices to their environmental conditions is merely an attempt, on their part, to get a maximum utilization of the resources at their command. They are consciously or unconsciously seeking to economize on their resources by producing those commodities which will give them a maximum of return for the resources used. In doing so, they necessarily depend upon obtaining from others commodities and services which they themselves are at a comparative disadvantage in producing. The inevitable consequence of such a development is that farmers in different regions will follow different lines of production.*

The following chapter headings indicate the content and the interpretations presented: Geography of American Agriculture and Characteristics of each Type of Farming; Regional Differentiation of the Agriculture of the United States; Relation of Physical and Economic Factors to the Geographic Distribution of Types of Farming; Variation in Organization on Farms of a Given Type; Appraisal of Results and Some of the Ways They May be Used. A map in color and printed on heavy paper is also available as a separate.

Mr. Elliott and his colleagues have done a splendid piece of research work—a real contribution. The clearness with which they have shown the relationship of man's agricultural activities to the geographic-economic setting will be especially interesting to geographers. It illustrates the practical, scientific, application of geographic principles to the interpretation of America's greatest industry and points the way for other studies along similar lines.

G.J.M.

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EDITORIAL NOTES AND NEWS

Transportation on the Transandine Railway on the Argentine side west of Mendoza was suspended in January for an indefinite period due to floods in the Mendoza River caused by heavy Andine snows. So widespread was the damage to the roadbed that the line will probably be shifted to a more protected position. In the meantime a bus service has been provided across the disrupted section. Passengers may, if they choose, take the direct air line service between Santiago and Mendoza which was inaugurated for mail in 1929 and extended to a twice weekly passenger service in 1930. The three quarters of an hour flight, at an elevation of 18,000 feet, has been safeguarded by the observation of trained weather observers along the route, reporting at regular intervals to Mendoza and Santiago. This traffic has grown to such an extent that bookings must sometimes be made weeks in advance. The air service is called Panagra, short for Pan American-Grace.

Travelers to Europe this summer will have the opportunity of seeing the Passion Play at Oberammergau. Usually it is given only at ten year intervals, the next decennial performance being scheduled for 1940. However, this year marks the three hundredth anniversary of the first presentation of the play which followed the vow the villagers made that if they would be spared further ravages of the plague which descended upon the village during the Thirty Years War they would thereafter, every ten years, enact this great drama. The descendants of these villagers have, with few exceptions, fulfilled this vow. At first the play was given in the church, then in the churchyard, and finally to accommodate the crowds it was given in a meadow on the border of the village. Now the action takes place on a large roofless platform which adjoins the open end of the theatre which has a seating capacity of 5,000. This stage arrangement not only gives the spectators the play action supported with scenery typical of Jerusalem, but also affords a view of the distant sky, fields, and mountains. The participants number 700, all of whom must be residents of Oberammergau.

Next summer a new passenger service between Chicago and San Francisco will be inaugurated via Denver when the new Moffat Tunnel is put in use following the completion of the Dotsero cut-off. The Moffat Tunnel cuts thru the Rockies at an elevation of about 9,000 feet.

The Italian Line led in trans-Atlantic passenger traffic during 1933. It made 113 sailings, carrying 79,931 passengers east and westbound. Its nearest competitor was the North German Lloyd, followed in turn by the Cunard Line, the International Mercantile Marine, the French Line, and the United States Lines.

Dr. Henry M. Leppard of the University of Chicago will edit the new maps and revise the old ones in the Goode's Series of Base Maps which were originated by the late J. Paul Goode.

According to a recent release from the Department of the Interior, the total capacity of water wheels at water-power plants in the United States is almost 16 million horsepower. This is an increase of 0.6 per cent over that of last year. This development represents about 20 per cent of the nations potential waterpower.

Lightning is not dangerous to air craft in flight is the conclusion reached by a group of specialists in meteorology and electricity who have served as a subcommittee of the National Advisory Committee for Aeronautics. They believe "It is possible, without serious complication, to render an airplane practically immune to serious danger either to the airplane or to the occupants." The same applies to an airship. The extremely violent winds of a thunderstorm, on the other hand, constitute a serious hazard, and should be avoided if possible.

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Peiping. By John Wesley Coulter 161

Dr. Coulter is a professor of geography in the University of Hawaii. During the summer of 1932 he spent three months in the Far East and this article records some of his interesting impressions of the ancient city of Peiping. Among Dr. Coulter's more recent contributions to geographical studies are, "Harbin: Strategic City on the Pioneer Fringe," in *Pacific Affairs*, Nov., 1932, and "Land Utilization in the Hawaiian Islands."

Unhappy Puerto Rico. By R. H. Whitbeck 172

Professor Whitbeck of the University of Wisconsin is well known to teachers of geography for his many research studies and his textbooks. His contribution on Puerto Rico, which is a result of his studies in the Island, is particularly timely because of the awakened public interest in that unhappy land.

The Place of Social Geography in the High School. By Charles C. Barnes 178

Mr. Barnes is head of the social science department, in the Detroit Public Schools, and an associate professor of the teaching of social science, School of Education, Wayne University, Detroit, Michigan. Mr. Barnes is the author of, and editor of several books in the social studies field. Our readers will recall his article, "Geography in Detroit Senior High Schools," which appeared in the JOURNAL, March, 1933.

Modern Tendencies in the Teaching of Geography. By Maurice A. Garfinkel 187

Mr. Garfinkel is Principal of the John Marshall Junior High School, Brooklyn, New York, and Lecturer, School of Education, College of the City of New York.

In the Rice Fields of Burma. By Ernest Young 194

Mr. Young was one of the pioneers in the teaching of human geography in England and is well known in America by his writings and by having served as visiting professor at the University of Chicago and the University of California at Los Angeles. This is the seventh article in our Unit Studies series.

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